45 DAY EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
CALIFORNIA BUILDING STANDARDS COMMISSION

REGARDING PROPOSED CHANGES TO
2007 CALIFORNIA BUILDING CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2, VOLUME 2, STRUCTURAL

LEGEND FOR EXPRESS TERMS
1. Existing California amendments or code language being modified: All such language appears in *italics*, modified language is underlined.
2. New California amendments: All such language appears *underlined and in italics*.
3. Repealed text: All such language appears in ~~strikeout~~.

EXPRESS TERMS

CHAPTER 16 – STRUCTURAL DESIGN

SECTION 1609- WIND LOADS

1609.1 Applications. Buildings, structures and parts thereof shall be designed to withstand the minimum wind loads prescribed herein. Decreases in wind loads shall not be made for the effect of shielding by other structures.

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapter 6 of ASCE 7 ***[BSC]*** *or provisions of the Alternate All-heights Method in Section 1609.6.* The type of opening protection required, the basic wind speed and the exposure category for a site shall be determined in accordance with Section 1609 or ASCE 7.Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of SBCCI SSTD 10 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AF&PA WFCM.
3. Designs using NAAMM FP 1001.
4. Designs using TIA/EIA-222 for antenna-supporting structures and antennas.

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1609.6 [BSC] Alternate All-Heights Method. *The alternate wind design provisions in this section are simplifications of the ASCE 7 Method 2-Analytical Procedure.*

1609.6.1 Scope*: As an alternate to ASCE 7 Section 6.5, the following provisions are permitted to be used to determine the wind effects on regularly shaped buildings, or other structures which meet all of the following conditions:*

1. *The building or other structure is less than or equal to 75 feet height having height to least width ratio of 4 or less, or the building or other structure has a fundamental frequency greater than or equal to 1 hertz.*
2. *The building or other structure is not sensitive to dynamic effects.*
3. *The building or other structure is not located on a site for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.*
4. *The building shall meet the requirements of a simple diaphragm building as defined in ASCE 7 Section 6.2.*

1609.6.1.1 Modifications*. The following modifications shall be made to certain subsections in ASCE 7: Section 1609.6.2 Symbols and Notations that are specific to this section are used in conjunction with the Symbols and Notations in ASCE 7 Section 6.3.*

1609.6.2 Symbols and Notations. *Coefficients and variables used in the Alternate All-Heights Method equations are as follows:*

C_{net} = net-pressure coefficient based on K_d [(G) (C_p) – (GC_{pi})], Ref. Table 1609.6.2(2)
G = Gust effect factor equal to 0.85 for rigid structures per ASCE 7 Section 6.5.8.1.
K_d = Wind directionality factor per ASCE 7 Table 6-4.
P_{net} = Design wind pressure to be used in determination of wind loads on buildings or other structures or their components and cladding, in lb/ft^2 (N/m^2).
q_s = Wind velocity pressure in lb/ft^2 (N/m^2). (Per Table 1609.6.2(1))

Table 1609.6.2(1)
Wind Velocity Pressure (q_s) at Standard Height of 33 Feet[a,b,c]

BASIC WIND SPEED, V (mph)	*85*	*90*	*100*	*105*	*110*	*120*	*125*	*130*	*140*	*150*	*160*	*170*
PRESSURE, q_s (psf)	*18.5*	*20.7*	*25.6*	*28.2*	*31.0*	*36.9*	*40.0*	*43.3*	*50.2*	*57.6*	*65.5*	*74.0*

a. For Wind Speeds not shown, use $q_s = 0.00256\ V^2$
b. Multiply by 1.61 to convert to km/h
c.Multiply by 0.048 to convert to kN/m^2

Table 1609.6.2(2) – Net Pressure Coefficients, C_{net}[a,b,c]

STRUCTURE OR PART THEREOF	DESCRIPTION			C_{net} FACTOR		
1. Main Wind Force Resisting Frames and Systems	WALLS:			Enclosed		Part Enclosed
	Windward Wall			0.43		0.11
	Leeward Wall			-0.51		-0.83
	Side Wall			-0.66		-0.97
	Parapet Wall	Windward		1.28		1.28
		Leeward		-0.85		-0.85
	ROOFS:			Enclosed		Part Enclosed
	Wind perpendicular to ridge					
	Leeward roof or flat roof			-0.66		-0.97
	Windward roof slopes:					
	Slope < 2:12 (10°)		Case 1	-1.09		-1.41
			Case 2	-0.28		-0.60
	Slope = 4:12 (18°)		Case 1	-0.73		-1.04
			Case 2	-0.05		-0.37
	Slope = 5:12 (23°)		Case 1	-0.58		-0.90
			Case 2	0.03		-0.29
	Slope = 6:12 (27°)		Case 1	-0.47		-0.78
			Case 2	0.06		-0.25
	Slope = 7:12 (30°)		Case 1	-0.37		-0.68
			Case 2	0.07		-0.25
	Slope 9:12 (37°)		Case 1	-0.27		-0.58
			Case 2	0.14		-0.18
	Slope 12:12 (45°)			-0.15		-0.47
	Wind parallel to ridge and flat roofs			-1.09		-1.41
	Non Building Structures: Chimneys, Tanks and Similar Structures:					
				h/D		
				1	7	25
	Square (Wind normal to face)			0.99	1.07	1.53
	Square (Wind on diagonal)			0.77	0.84	1.15
	Hexagonal or Octagonal			0.81	0.97	1.13
	Round			0.65	0.81	0.97
	Open Signs and Lattice Frameworks			Ratio of solid to gross area		
				< 0.1	0.1 to 0.29	0.3 to 0.7
	Flat			1.45	1.30	1.16
	Round			0.87	0.94	1.08

2. Components and Cladding not in areas of discontinuity – Roofs and overhangs	Roof Elements and slopes		Enclosed	Partially Enc.
	Gable or Hipped Configurations (Zone 1)			
	Flat < Slope < 6:12 (27°)			
	Positive	10 SF or less	0.58	0.89
		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.00	-1.32
		100 SF or more	-0.92	-1.23
	Overhang: Flat < Slope < 6:12 (27°)			
	Negative	10 SF or less	-1.45	
		100 SF or more	-1.36	
		500 SF or more	-0.94	
	6:12 (27°) < Slope < 12:12 (45°)			
	Positive	10 SF or less	0.92	1.23
		100 SF or more	0.83	1.15
	Negative	10 SF or less	-1.00	-1.32
		100 SF or more	-0.83	-1.15
	Monosloped Configurations (Zone 1)		Enclosed	Partially Enc.
	Flat < Slope < 7:12 (30°)			
	Positive	10 SF or less	0.49	0.81
		100 SF or more	0.41	0.72
	Negative	10 SF or less	-1.26	-1.57
		100 SF or more	-1.09	-1.40

	Tall flat topped roofs h> 60'		*Enclosed*	*Partially Enc.*
	Flat <slope < 2:12 (10°) (Zone 1)			
	Negative	*10 SF or less*	*-1.34*	*-1.66*
		500 SF or more	*-1.00*	*-1.32*
3. *Components and Cladding in areas of discontinuities – Roofs and overhangs*	*Roof Elements and slopes*		*Enclosed*	*Partially Enc.*
	Gable or Hipped Configurations at Ridges, Eaves and Rakes (Zone 2)			
	Flat < Slope < 6:12 (27°)			
	Positive	*10 SF or less*	*0.58*	*0.89*
		100 SF or more	*0.41*	*0.72*
	Negative	*10 SF or less*	*-1.68*	*-2.00*
		100 SF or more	*-1.17*	*-1.49*
	Overhang for Slope Flat < Slope < 6:12 (27°)			
	Negative	*10 SF or less*	*-1.87*	
		100 SF or more	*-1.87*	
	6:12 (27°) < Slope < 12:12 (45°)		*Enclosed*	*Partially Enc.*
	Positive	*10 SF or less*	*0.92*	*1.23*
		100 SF or more	*0.83*	*1.15*
	Negative	*10 SF or less*	*-1.17*	*-1.49*
		100 SF or more	*-1.00*	*-1.32*
	Overhang for 6:12 (27°) < Slope < 12:12 (45°)			
	Negative	*10 SF or less*	*-1.70*	
		100 SF or more	*-1.53*	
	Monosloped Configurations at Ridges, Eaves and Rakes (Zone 2)			
	Flat < Slope < 7:12 (30°)			
	Positive	*10 SF or less*	*0.49*	*0.81*

		100 SF or more	*0.41*	*0.72*
	Negative	*10 SF or less*	*-1.51*	*-1.83*
		100 SF or more	*-1.43*	*-1.74*
	Tall flat topped roofs h> 60'		*Enclosed*	*Partially Enc.*
	Flat <slope < 2:12 (10°) (Zone 2)			
	Negative	*10 SF or less*	*-2.11*	*-2.42*
		500 SF or more	*-1.51*	*-1.83*
	Gable or Hipped Configurations at Corners (Zone 3)			
	Flat < Slope < 6:12 (27°)		*Enclosed*	*Partially Enc.*
	Positive	*10 SF or less*	*0.58*	*0.89*
		100 SF or more	*0.41*	*0.72*
	Negative	*10 SF or less*	*-2.53*	*-2.85*
		100 SF or more	*-1.85*	*-2.17*
	Overhang for Slope Flat < Slope < 6:12 (27°)			
	Negative	*10 SF or less*	*-3.15*	
		100 SF or more	*-2.13*	
	6:12 (27°) < Slope < 12:12 (45°)			
	Positive	*10 SF or less*	*0.92*	*1.23*
		100 SF or more	*0.83*	*1.15*
	Negative	*10 SF or less*	*-1.17*	*-1.49*
		100 SF or more	*-1.00*	*-1.32*
	Overhang for 6:12 (27°) < Slope < 12:12 (45°)		*Enclosed*	*Partially Enc.*
	Negative	*10 SF or less*	*-1.70*	
		100 SF or more	*-1.53*	
	Monosloped Configurations at corners (Zone 3)			

	Flat < Slope < 7:12 (30°)			
	Positive	*10 SF or less*	*0.49*	*0.81*
		100 SF or more	*0.41*	*0.72*
	Negative	*10 SF or less*	*-2.62*	*-2.93*
		100 SF or more	*-1.85*	*-2.17*
	Tall flat topped roofs h> 60'		*Enclosed*	*Partially Enc.*
	Flat <slope < 2:12 (10°) (Zone 3)			
	Negative	*10 SF or less*	*-2.87*	*-3.19*
		500 SF or more	*-2.11*	*-2.42*
4. Components and Cladding not in areas of discontinuity - Walls and parapets	*Wall Elements: h ≤ 60' (Zone 4)*		*Enclosed*	*Partially Enc.*
	Positive	*10 SF or less*	*1.00*	*1.32*
		500 SF or more	*0.75*	*1.06*
	Negative	*10 SF or less*	*-1.09*	*-1.40*
		500 SF or more	*-0.83*	*-1.15*
	Wall Elements: h > 60' (Zone 4)			
	Positive	*20 SF or less*	*0.92*	*1.23*
		500 SF or more	*0.66*	*0.98*
	Negative	*20 SF or less*	*-0.92*	*-1.23*
		500 SF or more	*-0.75*	*-1.06*
	Parapet Walls			
	Positive		*2.87*	*3.19*
	Negative		*-1.68*	*-2.00*
5. Components and Cladding in areas of discontinuity - Walls and parapets	*Wall Elements: h ≤ 60' (Zone 5)*		*Enclosed*	*Partially Enc.*
	Positive	*10 SF or less*	*1.00*	*1.32*
		500 SF or more	*0.75*	*1.06*

	Negative	*10 SF or less*	*-1.34*	*-1.66*
		500 SF or more	*-0.83*	*-1.05*
	Wall Elements: h > 60' (Zone 5)			
	Positive	*20 SF or less*	*0.92*	*1.23*
		500 SF or more	*0.66*	*0.98*
	Negative	*20 SF or less*	*-1.68*	*-2.00*
		500 SF or more	*-1.00*	*-1.32*
	Parapet Walls			
	Positive		*3.64*	*3.95*
	Negative		*-2.45*	*-2.76*

a. Linear interpolation between values in the table is acceptable.
b. For open buildings, multispan gable roofs, stepped roofs, sawtooth roofs, domed roofs, solid free standing walls amd solid signs apply ASCE 7.
c. Some Cnet values have been grouped together. Less conservative results may be obtained by applying ASCE 7.

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1609.6.3 Design Equations. *When using the Alternate All-Heights Method, the Main-Wind-Force-Resisting System (MWFRS), and Components and Cladding of every structure shall be designed to resist the effects of wind pressures on the building envelope in accordance with Equation (16-36).*

$P_{net} = q_s K_z C_{net} [I K_{zt}]$ *(Equation 16-36)*

Design wind forces for the MWFRS shall not be less than 10 lb/ft^2 (0.48 KN/m^2) multiplied by the area of the structure projected on a plane normal to the assumed wind direction. See ASCE Section 6.1.4 for criteria. Design net wind pressure for components and cladding shall not be less than 10 lb/ft^2 (0.48 KN/m^2) acting in either direction normal to the surface.

1609.6.4 Design Procedure. *The MWFRS and the components and cladding of every building or other structure shall be designed for the pressures calculated using Equation (16-36).*

1609.6.4.1 Main Wind-Force-Resisting Systems. *The MWFRS shall be investigated for the torsional effects identified in ASCE 7 Figure 6-9.*

1609.6.4.2 Determination of K_z and K_{zt}. Velocity Pressure Exposure Coefficient, *K_z shall be determined in accordance with ASCE 7 Section 6.5.6.6 and the Topographic Factor, K_{zt} shall be determined in accordance with ASCE 7 Section 6.5.7.*

1. *For the windward side of a structure, K_{zt} and K_z shall be based on height z. For leeward and side walls, and for windward and leeward roofs, K_{zt} and K_z shall be based on mean*

roof height h.

1609.6.4.3 Determination of Net Pressure Coefficients, *C_{net}. For the design of the Main Wind-Force-Resisting-System and for Components and Cladding, the sum of the internal and external net pressure shall be based on the net pressure coefficient C_{net}.*

1. *The pressure coefficient, C_{net}, for walls and roofs shall be determined from Table 1609.6.2(2).*
2. *Where C_{net} may have more than one value, the more severe wind load combination shall be used for design.*

1609.6.4.4 Application of Wind Pressures*. When using the Alternate All-Heights Method, wind pressures shall be applied simultaneously on, and in a direction normal to, all building envelope wall and roof surfaces.*

1609.6.4.4.1 Components and Cladding. *Wind pressure for each component or cladding element is applied as follows using C_{net} values based on the effective wind area, A, contained within the zones in areas-of-discontinuity of width and/or length "a", "2a" or "4a" at: corners of roofs and walls; edge strips for ridges, rakes and eaves; or field areas on walls or roofs as indicated in Figures in Table 1609.6.2(2) in accordance with the following:*

1. *Calculated pressures at local discontinuities acting over specific edge strips or corner boundary areas.*
2. *Include "field" (zone 1, 2 or 4, as applicable) pressures applied to areas beyond the boundaries of the areas-of-discontinuity.*
3. *Where applicable, the calculated pressures at discontinuities (zones 2 or 3) shall be combined with design pressures that apply specifically on rakes or eave overhangs.*